

Claims

1. A process of dewatering aqueous suspension employing a flocculating system comprising treating the suspension with a flocculating amount of a first flocculant and a dewatering amount of a second flocculant, and subjecting the suspension to mechanical dewatering to form a cake,
5 wherein the first flocculant brings about flocculation and assists thickening of the suspension and the second flocculant further dewateres the suspension, characterised in that the second flocculant is a water-soluble or water swellable polymer that is mixed into the suspension in the form of a water-soluble or water
10 swellable particulate polymer having a particle diameter of at least 20 microns, wherein the first and second flocculants are not counterionic.
2. A process according to claim 1 in which the aqueous suspension is sewage sludge.
3. A process according to claim 1 or claim 2 in which the mechanical
15 dewatering employs an apparatus selected from the group consisting of belt press, filter press, screw press and centrifuge.
4. A process according to any of claims 1 to 3 in which the second flocculant is a particulate polymer having a particle diameter of at least 50 microns, preferably 100 to 2000 microns.
- 20 5. A process according to any of claims 1 to 4 in which the second flocculant is a cationic polymer.
6. A process according to any of claims 1 to 5 in which the second flocculant is formed from at least 50% by weight cationic monomer or monomers.
- 25 7. A process according to any of claims 1 to 6 in which the second flocculant is selected from the group consisting of cationic polyacrylamides, polymers of dialkyl diallyl ammonium chloride, dialkyl amino alkyl (meth) - acrylates (or salts thereof) and dialkyl amino alkyl (meth)-acrylamides (or salts thereof).

8. A process according to any of claims 1 to 7 in which the second flocculant has an intrinsic viscosity of at least 0.5 dl/g, preferably 4 to 10 dl/g.

9. A process according to any of claims 1 to 8 in which the second flocculant is selected from the group consisting of,

- 5 i) a polymer formed from 80 to 100% by weight methyl chloride quaternary ammonium salt of dimethyl amino ethyl (meth) acrylate and 0 to 20% by weight acrylamide of intrinsic viscosity between 4 and 10 dl/g,
- ii) polyvinyl amidine and polyvinyl amines of intrinsic viscosity greater than 1 dl/g,
- 10 iii) quaternised salts of Mannich addition polyacrylamides of intrinsic viscosity greater than 1 dl/g, and
- iv) poly dimethyl diallyl ammonium chloride of intrinsic viscosity greater than 0.5 dl/g.

10. A process according to any of claims 1 to 9 in which the first flocculant is a cationic organic polymer.

11. A process according to claim 10 in which the polymer is selected from the group consisting of acrylamide polymers, polyvinyl amidine, polyvinyl amine, poly dimethyl diallyl ammonium chloride, poly amines, polyethyleneimines, mannich polyacrylamides and quaternised mannich polyacrylamides.

20 12. A process according to any of claims 1 to 11 in which the first flocculant and second flocculant are added substantially simultaneously.

13. A process according to any of claims 1 to 12 in which the first flocculant and second flocculant are combined into a single composition.

25 14. A process according to claim 13 in which the single composition is a particulate polymer product in which the first flocculant comprises particles having a diameter below 10 microns and the second flocculant comprises particles having a diameter above 20 microns, preferably above 50 microns.

15. A process according to any of claims 1 to 14 in which the second flocculant comprises polymeric particles having a coating applied to the surface.

30 16. A process according to claim 15 in which the coating is a silicone.

17. A process according to claim 15 in which the coating is a water-soluble wax.
18. A process according to any of claims 1 to 17 in which the second flocculant is introduced into the suspension in form of a slurry in a liquid.
- 5 19. A process according to claim 18 in which the liquid is polyethylene glycol.